

FRASER'S DOLPHIN (*Lagenodelphis hosei*): Hawaii Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Fraser's dolphins are distributed worldwide in tropical waters (Dolar 2009 in Perrin *et al.* 2009). The species was first documented within the U.S. Exclusive Economic Zone (EEZ) of the Hawaiian Islands during a 2002 cetacean survey (Barlow 2006) and have been occasionally observed during surveys of Hawaiian waters since that time (Bradford *et al.* 2017, Yano *et al.* 2018, Figure 1). There have been only 4 sightings of Fraser's dolphins during nearshore surveys in the leeward main Hawaii Islands since the early 2000s (Baird *et al.* 2013).

For the Marine Mammal Protection Act (MMPA) stock assessment reports, there is a single Pacific management stock including animals found both within the Hawaiian Islands EEZ and in adjacent high seas waters. Because data on abundance, distribution, and human-caused impacts are largely lacking for high seas waters, the status of this stock is evaluated based on data from U.S. EEZ waters of the Hawaiian Islands (NMFS 2005).

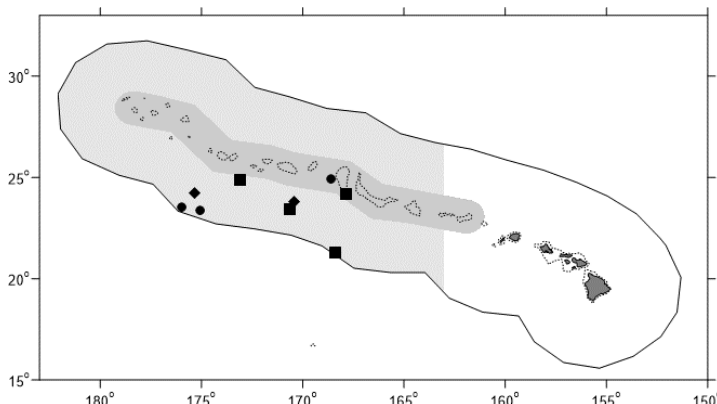


Figure 1. Fraser's dolphin sighting locations during the 2002 (diamond), 2010 (circle), and 2017 (square) shipboard cetacean surveys of U.S. waters surrounding the Hawaiian Islands (Barlow 2006, Bradford *et al.* 2017, Yano *et al.* 2018). Outer line indicates approximate boundary of survey area and U.S. EEZ. Dark gray shading indicates original Papahānaumokuākea Marine National Monument, with the lighter gray shading denoting the full 2016 Expansion area. Dotted line represents the 1000 m isobath.

POPULATION SIZE

Encounter data from shipboard line-transect surveys of the entire Hawaiian Islands EEZ was recently reevaluated for each survey year, resulting in the following abundance estimates of Fraser's dolphins in the Hawaii EEZ (Bradford *et al.* 2021; Table 1).

Table 1. Line-transect abundance estimates for Fraser's dolphins derived from surveys of the entire Hawaii EEZ in 2002, 2010, and 2017 (Bradford *et al.* 2021).

Year	Abundance	CV	95% Confidence Limits
2017	40,960	0.70	11,887-141,143
2010	56,688	0.70	16,391-196,056
2002	28,980	1.02	5,518-152,195

The updated design-based abundance estimates use sighting data from throughout the central Pacific to estimate the detection function and use Beaufort sea-state-specific trackline detection probabilities for Fraser's dolphins from Barlow *et al.* (2015). Although previous estimates from the Hawaii EEZ have been published using subsets of this data, Bradford *et al.* (2021) uses a consistent approach for estimating all abundance parameters and resulting estimates are considered the best available. The best estimate of abundance is based on a 2017 survey, or 40,960 (CV=0.70). Population estimates for Fraser's dolphins have been made in the eastern tropical Pacific (Wade and Gerrodette 1993), but it is not known whether these animals are part of the same population that occurs around the Hawaiian Islands and in the central North Pacific.

Minimum Population Estimate

The minimum population size is calculated as the lower 20th percentile of the log-normal distribution (Barlow *et al.* 1995) of the 2017 abundance estimate or 24,068 Fraser's dolphins.

Current Population Trend

The three available abundance estimates for this stock have very broad and overlapping confidence intervals, precluding robust evaluation of population trend for this stock.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No data are available on current or maximum net productivity rate for Fraser's dolphins.

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for the Hawaii stock of Fraser's dolphin is calculated as the minimum population size within the U.S. EEZ of the Hawaiian Islands (24,068) times one half the default maximum net growth rate for cetaceans ($\frac{1}{2}$ of 4%) times a recovery factor of 0.50 (for a stock of unknown status with no known fishery mortality or serious injury within the Hawaiian Islands EEZ; Wade and Angliss 1997), resulting in a PBR of 241 Fraser's dolphins per year.

HUMAN CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

Information on fishery-related mortality and serious injury of cetaceans in Hawaiian waters is limited, but the gear types used in Hawaiian fisheries are responsible for marine mammal mortality and serious injury in other fisheries throughout U.S. waters. No interactions between nearshore fisheries and Fraser's dolphins have been reported in Hawaiian waters. There are currently two distinct longline fisheries based in Hawaii: a deep-set longline (DSL) fishery that targets primarily tunas, and a shallow-set longline fishery (SSL) that targets swordfish. Both fisheries operate within U.S. waters and on the high seas. Between 2014 and 2018, no Fraser's dolphins were observed hooked or entangled in the SSL fishery (100% observer coverage) or the DSL fishery (20-21% observer coverage) (Bradford 2018a, 2018b, 2020, Bradford and Forney 2017, McCracken 2019). There were two other unidentified cetaceans taken in the DSL fishery during this period, which may have been Fraser's dolphins.

STATUS OF STOCK

The Hawaii stock of Fraser's dolphins is not considered strategic under the 1994 amendments to the MMPA. The status of Fraser's dolphins in Hawaiian waters relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance. No habitat issues are known to be of concern for this stock. Fraser's dolphins are not listed as "threatened" or "endangered" under the Endangered Species Act (1973), nor designated as "depleted" under the MMPA. Given the absence of recent recorded fishery-related mortality or serious injuries the total fishery mortality and serious injury can be considered to be insignificant and approaching zero.

REFERENCES

- Baird, R.W. 2016. The Lives of Hawai'i's Dolphins and Whales, Natural History and Conservation. University of Hawaii Press. 341p.
- Barlow, J. 2006. Cetacean abundance in Hawaiian waters estimated from a summer/fall survey in 2002. *Marine Mammal Science* 22(2):446-464.
- Barlow, J. 2015. Inferring trackline detection probabilities, $g(0)$, for cetaceans from apparent densities in different survey conditions. *Marine Mammal Science* 31:923-943.
- Barlow, J., S.L. Swartz, T.C. Eagle, and P.R. Wade. 1995. U.S. Marine Mammal Stock Assessments: Guidelines for Preparation, Background, and a Summary of the 1995 Assessments. U.S. Dept. of Commerce, NOAA Technical Memorandum NMFS-OPR-6, 73 p.
- Bradford, A.L. 2018a. Injury Determinations for Marine Mammals Observed Interacting with Hawaii and American Samoa Longline Fisheries During 2015-16. U.S. Dept. of Commerce, NOAA Technical Memorandum NMFS-PIFSC-70, 27p. <https://doi.org/10.7289/V5/TM-PIFSC-70>.
- Bradford AL. 2018b. Injury Determinations for Marine Mammals Observed Interacting with Hawaii and American Samoa Longline Fisheries During 2017. NOAA Technical Memorandum NMFS-PIFSC -76, 14 p. [doi:10.25923/fzad-4784](https://doi.org/10.25923/fzad-4784).
- Bradford, A.L. 2020. Injury Determinations for Marine Mammals Observed Interacting with Hawaii and American

- Samoa Longline Fisheries During 2018. [NOAA-TM-NMFS-PIFSC-99](#).
- Bradford, A.L. and K.A. Forney. 2017. Injury determinations for cetaceans observed interacting with Hawaii and American Samoa longline fisheries during 2010-2014. [NOAA-TM-NMFS-PIFSC-62](#).
- Bradford, A.L., K.A. Forney, E.M. Oleson, and J. Barlow. 2017. Abundance estimates of cetaceans from a line-transect survey within the U.S Hawaiian Islands Exclusive Economic Zone. Fishery Bulletin [115: 129-142](#).
- Bradford, A.L., E.M. Oleson, K.A. Forney, J.E. Moore, and J. Barlow. 2021. Line-transect abundance estimates of cetaceans in U.S. waters around the Hawaiian Islands in 2002, 2010, and 2017. [NOAA-TM-NMFS-PIC-115](#).
- McCracken, M.L. 2019. Assessment of incidental interactions with marine mammals in the Hawaii longline deep and shallow-set fisheries from 2014 through 2018. PIFSC Data Report [DR-19-031](#).
- NMFS. 2005. [Revisions to Guidelines for Assessing Marine Mammal Stocks](#). 24 pp.
- NMFS. 2012. [NOAA Fisheries Policy Directive 02-038-01 Process for Injury Determinations \(01/27/12\)](#).
- Perrin, W.F., B. Würsig, and J.G.M. Thewissen. 2009. Encyclopedia of Marine Mammals. Second Edition. Academic Press, Amsterdam.
- Wade, P.R. and R.P. Angliss. 1997. Guidelines for Assessing Marine Mammal Stocks: Report of the GAMMS Workshop April 3-5, 1996, Seattle, Washington. U.S. Dept. of Commerce, NOAA Technical Memorandum [NMFS-OPR-12](#). 93 pp.
- Wade, P.R. and T. Gerrodette. 1993. Estimates of cetacean abundance and distribution in the eastern tropical Pacific. Rep. Int. Whal. Commn. 43:477-493.
- Yano K.M., E.M. Oleson, J.L. Keating, L.T. Balance, M.C. Hill, A.L. Bradford, A.N. Allen, T.W. Joyce, J.E. Moore, and A. Henry. 2018. Cetacean and seabird data collected during the Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), July-December 2017. U.S. Dept. of Commerce, [NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-72](#), 110 p.